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(54) 【発明の名称】 粘着シート

(57) 【要約】

【目的】表面基材にフィルムを用いた粘着シートに関し、パルプを再生する際に粘着剤及びフィルムが悪影響を及ぼすことなく容易に離解することのできる、リサイクル工程に適応しても構成しない粘着シートを提供する。

【構成】表面基材が、アルカリ水溶液に対して難解性をもつた高分子工程に混入しても構わない粘着シートを提供する。

有し、乳酸系ポリマーから成るフィルムであり、粘着剤層を構成する粘着剤が下記の組成からなるカルボン酸変性ロジン含有アクリル酸エステル共重合体をアルカリ性物質で中和した共重合体であり、水またはアルカリ水溶液に対して再離解性を有する粘着剤であることを特徴とする粘着シート。

(a) カルボン酸変性ロジンエステルモノマー ··· 5~40重量%
 (b) (ポリ)エチレングリコール(メタ)アクリレートモノマー ··· 5~40重量%
 (c) (メタ)アクリル酸のC₄~C₁₈アルキルエステルモノマー ··· 30~60重量%
 (d) エチレン性不飽和カルボン酸含有モノマー ··· 5~20重量%
 (e) 上記a, b, cおよびdと共重合可能なモノマー ··· 5~20重量%

【特許請求の範囲】

【請求項1】剥離シート、粘着剤層、表面基材を積層してなる粘着シートにおいて、表面基材が、アルカリ水溶液に対して離解性を有し、乳酸系ポリマーから成るフィルムであり、粘着剤層を構成する粘着剤が下記の組成か*

- (a) カルボン酸変性ロジンエステルモノマー ··· 5~40重量%
- (b) (ポリ)エチレングリコール(メタ)アクリレートモノマー ··· 5~40重量%
- (c) (メタ)アクリル酸のC₄~C₁₈アルキルエステルモノマー ··· 30~60重量%
- (d) エチレン性不飽和カルボン酸含有モノマー ··· 5~20重量%
- (e) 上記a, b, cおよびdと共に重合可能なモノマー ··· 5~20重量%

【請求項2】剥離シートが、水またはアルカリ水溶液に対して再離解性を有する基材からなることを特徴とする請求項1記載の粘着シート。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、表面基材にフィルムを用いた粘着シートに関するものであり、詳しくは、パルプを再生する際に粘着剤及びフィルムが悪影響を及ぼすことなく容易に離解することのできる、リサイクル工程に混入しても構わない粘着シートに関するものである。

【0002】

【従来の技術】粘着シートは、商業用、事務用、家庭用など非常に広範囲にわたってラベル、シール、ステッカー、ワッペン等に加工して使用されている。粘着シートの一般的な構成は、表面基材と剥離シートとの間に粘着剤層を形成したものであり、表面基材には紙、フィルム、金属箔等が用いられ、剥離シートとしてはグラシン紙のような高密度原紙、クレーコート紙、ポリエチレンラミネート原紙等にシリコーン化合物やフッ素化合物の如き剥離剤を塗被したものが用いられる。また、粘着剤としては、ゴム系、アクリル系、ビニルエーテル系等のエマルジョン、溶剤又は無溶剤型の各種粘着剤が使用される。かかる粘着シートは、商品等に貼付けされた後は被着体に貼りついたまま永続的に利用される永久接着タイプのものと、商品等の関係から表示の目的を達成した後は剥離され破棄される再剥離タイプのものとある。

【0003】一方、古紙のリサイクルに関しては、現在わが国ではパルプ製造のための原料として、再生用損紙を含む古紙の使用量は、紙、板紙生産原料の50%を超えており、既に主原料の位置を占めるまでになっている。再生パルプ化可能な古紙は、新聞、ダンボール、雑誌、模造、色上(アートを含む)、上白、カード、特白、中白、白マニラ、切符、中更反古、茶模造紙(洋段を含む)、台紙、地券、ボール、感熱記録紙、感圧複写紙、O C R用紙などである。これら古紙からの再生パルプ化法は、一般的には古紙を離解してパルプ懸濁液を得る離解工程、パルプ懸濁液中の異物を分離する粗選、精選

* らなるカルボン酸変性ロジン含有アクリル酸エステル共重合体をアルカリ性物質で中和した共重合体であり、水またはアルカリ水溶液に対して再離解性を有する粘着剤であることを特徴とする粘着シート。

(a) カルボン酸変性ロジンエステルモノマー ··· 5~40重量%

(b) (ポリ)エチレングリコール(メタ)アクリレートモノマー ··· 5~40重量%

(c) (メタ)アクリル酸のC₄~C₁₈アルキルエステルモノマー ··· 30~60重量%

(d) エチレン性不飽和カルボン酸含有モノマー ··· 5~20重量%

(e) 上記a, b, cおよびdと共に重合可能なモノマー ··· 5~20重量%

※選択工程、印刷インクを分離する脱墨工程、色を白くする漂白工程を経て再生パルプ化が行われる。

【0004】しかし、ワックス加工した紙や、ポリエチレンラミネートを施した紙、粘着シートなどは、パルプ纖維から水に不溶なワックス、ポリエチレン、粘着剤などを分離することができず再生パルプ化が困難な古紙とされている。特に粘着シートの場合は、水に不溶な粘着剤が5~50%も含まれており、更にこの粘着剤は粘着力が強いために、パルプ纖維からの分離が不可能とされている。

【0005】再生パルプ中に粘着剤が含まれたままで、該再生パルプを使用して抄紙すると、抄紙工程で粘着剤がワイヤーの目を塞いだり、プレスロールや毛布を汚したりし、紙切れ等を起こす原因となり、抄紙効率を著しく低下させるという問題が生じたり、紙面上に斑点を形成してしまうなど、紙層形成または品質面で悪影響を及ぼすという問題がある。

【0006】取り分け、表面基材にポリエチレン、ポリ塩化ビニル、ポリスチレン、ポリエチレンテレフタレート等のプラスチックフィルムを用いた粘着シートは、離解されない、或いは殆ど離解されず、除去が困難であるとともに再生パルプ化工程に悪影響を及ぼしている。現状ではフィルムを表面基材にした粘着シートを含む古紙は、例えば、回収された雑誌の中よりいちいち手作業で粘着シートだけを分離し、産業廃棄物として処理しているのが実状である。

【0007】

【発明が解決しようとする課題】本発明は、上記の問題を解決し、一般古紙に混入されても容易に離解され、再生パルプ化に悪影響を及ぼすことがない、表面基材にフィルムを用いた粘着シートを提供するものである。

【0008】

【課題を解決するための手段】本発明は、剥離シート、粘着剤層、表面基材を積層してなる粘着シートにおいて、表面基材が、アルカリ水溶液に対して離解性を有し、乳酸系ポリマーから成るフィルムであり、粘着剤層を構成する粘着剤が下記の組成からなるカルボン酸変性

3

ロジン含有アクリル酸エステル共重合体をアルカリ性物質で中和した共重合体であり、水またはアルカリ水溶液*に対して再離解性を有する粘着剤であることを特徴とする粘着シートである。

- (a) カルボン酸変性ロジンエステルモノマー ··· 5~40重量%
- (b) (ポリ)エチレングリコール(メタ)アクリレートモノマー ··· 5~40重量%
- (c) (メタ)アクリル酸のC₄~C₁₈アルキルエステルモノマー ··· 30~60重量%
- (d) エチレン性不飽和カルボン酸含有モノマー ··· 5~20重量%
- (e) 上記a, b, cおよびdと共に重合可能なモノマー ··· 5~20重量%

【0009】

【作用】本発明は、表面基材として乳酸系ポリマーからなるフィルムを用いるものである。本発明の課題を解決するために、ポリヒドロキシ酪酸やヒドロキシ酪酸とヒドロキシ吉草酸の共重合体、ポリ(3-ヒドロキシアルカノエート)等のヒドロキシカルボン酸のポリマー、ポリブチレンサクシネートやポリエチレンサクシネートあるいはそれらとコハク酸との縮合体といった、アルカリ水溶液に対して離解性を有するフィルムも考えられるが、これらはフィルムが不透明であり、また弾力性があり粘着加工時にしづが発生する恐れがあり、粘着シートとしての品質が不十分である。

【0010】乳酸系ポリマーの具体例としては、ポリ乳酸、乳酸またはラクトドとグリコール酸、ヒドロキシ酪酸、ヒドロキシ吉草酸、ヒドロキシペンタン酸、ヒドロキシカプロン酸、ヒドロキシヘプタン酸等のヒドロキシカルボン酸との共重合体などを挙げることができる。ポリ乳酸の構成単位は、L-乳酸からのみなるポリ(L-乳酸)、D-乳酸からのみなるポリ(D-乳酸)、およびその両方が色々な割合で連なるポリ(D,L-乳酸)の※

- (a) カルボン酸変性ロジンエステルモノマー ··· 5~40重量%
- (b) (ポリ)エチレングリコール(メタ)アクリレートモノマー ··· 5~40重量%
- (c) (メタ)アクリル酸のC₄~C₁₈アルキルエステルモノマー ··· 30~60重量%
- (d) エチレン性不飽和カルボン酸含有モノマー ··· 5~20重量%
- (e) 上記a, b, cおよびdと共に重合可能なモノマー ··· 5~20重量%

の組成からなるカルボン酸変性ロジン含有アクリル酸エステル共重合体を、アルカリで中和した共重合体である。

【0014】かかる(a)カルボン酸変性ロジンエステ

10※いずれも使用できる。

【0011】好ましく用いられる乳酸系ポリマーは、原料モノマーを脱水縮合するか、或いは乳酸の環状二量体であるラクチド、およびグリコリド、カプロラクトン、プロピオラクトン、ブチロラクトン、バレロラクトンなどの環状エステル類を開環重合することにより得ることができる。なお、ポリマーの分子量は、重量平均分子量で5万~100万程度であることが好ましい。因みに、分子量が5万に満たない場合、物理強度や耐熱寸法安定性が悪くなる傾向にあり、粘着加工に適さない。また、分子量が100万を越えるとフィルムが鋼直になりすぎ、やはり粘着加工に適さない。

【0012】かかる表面基材は、粘着シートの分野で行われている各種加工が施してもよく、例えば、顔料塗被層を設けて印刷適正を改良したり、感熱発色層やインク受容層等を設けて各種記録体としての機能を付与したり、或いは隠蔽層などを設けてもよく、更には着色や印刷を施しても構わない。

【0013】本発明の粘着シートにおいて使用される粘着剤は、

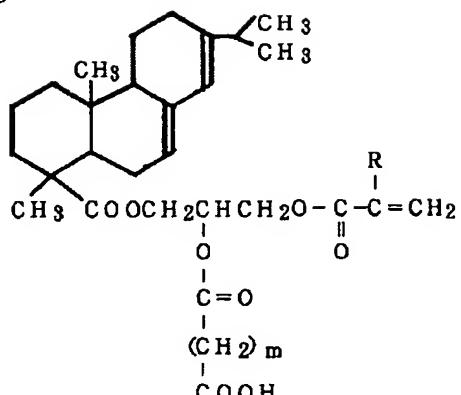
- (a) カルボン酸変性ロジンエステルモノマー ··· 5~40重量%
- (b) (ポリ)エチレングリコール(メタ)アクリレートモノマー ··· 5~40重量%
- (c) (メタ)アクリル酸のC₄~C₁₈アルキルエステルモノマー ··· 30~60重量%
- (d) エチレン性不飽和カルボン酸含有モノマー ··· 5~20重量%
- (e) 上記a, b, cおよびdと共に重合可能なモノマー ··· 5~20重量%

★ルモノマーとしては、下記一般式1に表される化合物が例示できる。

【0015】

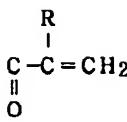
【化1】

5



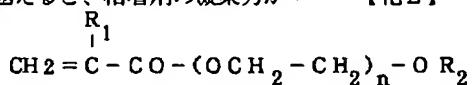
6

〔1〕



【0016】〔式中、Rはメチル基または水素原子、mは1~8の整数を示す。〕

【0017】なお、カルボン酸変性ロジンエステルモノマーは、5~40重量%の範囲で共重合させる必要がある。因みに、5重量%未満では、水再離解性が不十分となる。一方、40重量%を越えると、粘着剤の凝集力が*



【0020】〔式中、R₁はメチル基または水素原子、R₂はメチル基、フェニル基、アクリロイル基またはメタクロリル基、nは1~10の整数を示す。〕

【0021】なお、(ポリ)エチレングリコール(メタ)アクリレートモノマーは、5~40重量%の範囲で共重合させる必要がある。因みに5重量%未満では、アルカリ水溶液に対する離解性が不十分となる。一方、40重量%を超えると、粘着剤の凝集力が低下して、粘着シートの機能が低下する。

【0022】また、(c)(メタ)アクリル酸のC₄~C₁₈アルキルエステルモノマーの具体例としては、(メタ)アクリル酸ブチル、(メタ)アクリル酸ヘキシル、(メタ)アクリル酸オクチル、(メタ)アクリル酸-2-エチルヘキシル、(メタ)アクリル酸ステアリル等が挙げられる。そして、このモノマーの共重合体部分に占める割合は、30~60重量%の範囲で共重合される。因みに、30重量%未満では、粘着剤の粘着力が乏しくなり、60重量%を越えると、水再離解性が不十分となる。

【0023】また、(d)エチレン性不飽和カルボン酸含有モノマーの具体例としては、アクリル酸、メタクリル酸、クロトン酸、マレイン酸、フマル酸、モノアルキルマレイン酸、モノアルキルイタコン酸、モノアルキルフマル酸等が挙げられる。そして、このモノマーの共重合体部分に占める割合は、5~20重量%の範囲で共重合される。因みに、5重量%未満では、粘着剤の凝集力が乏しくなり、20重量%を越えると、粘着剤の粘着力が不十分となる。

【0024】更に、(e)上記(a)、(b)、(c)および(d)と共に重合可能な他のモノマーの具体例とし※50

*乏しくなり、粘着シートの機能が低下する。

【0018】また、(b)(ポリ)エチレングリコール(メタ)アクリレートモノマーとしては、下記一般式2に表される化合物が例示できる。

【0019】

【化2】

※では、(メタ)アクリル酸メチル、(メタ)アクリル酸エチル、(メタ)アクリル酸プロピル、(メタ)アクリル酸シクロヘキシル、(メタ)アクリル酸メトキシエチル、(メタ)アクリル酸エトキシエチル、(メタ)アクリル酸ジメチルアミノエチル、(メタ)アクリル酸ジエチルアミノエチル、(メタ)アクリル酸グリシジル、酢酸ビニル、プロピオン酸ビニル、塩化ビニル、塩化ビニリデン、スチレン、ジビニルベンゼン、エチレン、(メタ)アクリロニトリル、(メタ)アクリルアミド、N-ブトキシメチル(メタ)アクリルアミド、N,N'-メチレンビス(メタ)アクリルアミド等が挙げられる。そして、共重合体に占めるこれらの共重合可能なモノマーの割合は、5~20重量%の範囲で調節される。

【0025】なお、これらの共重合可能な他のモノマー(e)の中でも特に、(メタ)アクリル酸メチル、(メタ)アクリル酸ジメチルアミノエチル、(メタ)アクリル酸グリシジル、ジビニルベンゼン、(メタ)アクリロニトリル、(メタ)アクリルアミド、N-メトキシメチル(メタ)アクリルアミド、N,N'-メチレンビス(メタ)アクリルアミド等は架橋性、ガラス転移温度、接着性能等の面から好ましい。

【0026】ここで、本発明の粘着剤に対する上記各モノマーの役割について簡単に説明すると、粘着剤の水再分散性を付与する成分として、(a)カルボン酸変性ロジンエステルモノマーと(b)(ポリ)エチレングリコール(メタ)アクリレートモノマーが共に重要であり、次に粘着剤の粘着性を付与する成分としては、(c)

(メタ)アクリル酸のC₄~C₁₈アルキルエステルモノマーが重要であり、更に粘着剤の凝集力を付与する成分

としては、(d) エチレン性不飽和カルボン酸含有モノマーが重要である。

【0027】従って、本発明の如く水に対して再離解性が優れ、且つ良好な接着性能を有する粘着剤を得るためにには、上記の(a)カルボン酸変性ロジンエステルモノマー、(b)(ポリ)エチレングリコール(メタ)アクリレートモノマー、(c)(メタ)アクリル酸のC₄～C₁₈アルキルエステルモノマー、(d)エチレン性不飽和カルボン酸含有モノマー、及び、(e)それらと共に重合可能な他のモノマーの配合のバランスが極めて重要である。

【0028】なお、上記の共重合体の製造方法については、特に限定されるものではなく、例えば、水、溶剤、連鎖移動剤、重合開始剤等の存在下で溶液重合する方法や、乳化剤、連鎖移動剤、重合開始剤、分散剤等の存在下の水系でエマルジョン重合する方法などの公知の方法で製造される。

【0029】重合時のモノマー濃度は、通常30～70重量%、好ましくは40～60重量%程度が適当である。また重合の際に使用される重合開始剤としては、例えば過硫酸カリウム、過硫酸アンモニウム等の過硫酸塩、2,2'-アゾビスイソブチロニトリル、2,2'-アゾビス(2,4-ジメチルバレロニトリル)等のアゾ系化合物、過酸化水素、ベンゾイルパーオキサイド、ラウリルパーオキサイド等の過酸化物、過硫酸アンモニウムと亜硫酸ソーダ、酸性亜硫酸ソーダ等との組合せからなる、いわゆるレドックス系の重合開始剤等が挙げられる。重合開始剤の使用量は、通常重合に共するモノマー全量に対して、0.2～2重量部、より好ましくは、0.3～1重量部の範囲で調節される。

【0030】更に、共重合に際して添加する連鎖移動剤としては、オクチルメルカプタン、ノニルメルカプタン、デシルメルカプタン、ドデシルメルカプタン等のアルキルメルカプタン類、チオグリコール酸オクチル、チオグリコール酸ノニル、チオグリコール酸-2-エチルヘキシル、β-メルカプトプロピオン酸-2-エチルヘキシル等のチオグリコール酸エステル類、2,4-ジフェニル-4-メチル-1-ペンテン、1-メチル-4-イソプロピリデン-1-シクロヘキセン等を挙げることができる。特に、チオグリコール酸エステル類、2,4-ジフェニル-4-メチル-1-ペンテン、1-メチル-4-イソプロピリデン-1-シクロヘキセンを使用した場合には、得られる共重合体が低臭気となり好ましい。なお、連鎖移動剤の使用量は、重合させる全モノマーの0.001～3重量部程度の範囲で調節される。

【0031】なお、重合反応は、通常60～100℃の温度条件下で、2～8時間かけて行われる。さらに、濡れ剤、レベリング剤、増粘剤、消泡剤、防腐剤等を適宜添加することができる。

【0032】上記の方法で得られた共重合体は、その共

重合体中のカルボキシル基を、例えば水酸化ナトリウム、水酸化カリウム、アンモニア、各種の第1級、第2級、第3級アミン等の適當なアルカリ性物質で中和することにより水溶性を付与し、従って得られた共重合体皮膜の水再分散性が出現するものである。

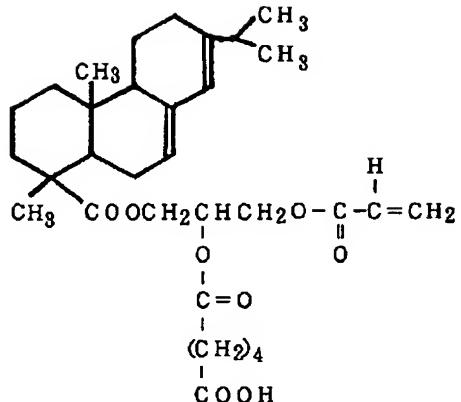
【0033】上記の共重合体のガラス転移温度は、-60～-30℃の範囲のものであり、目的に応じて適宜選択される。因みに、共重合体のガラス転移温度が-60℃未満になると、得られる皮膜の凝集力が不十分となり、逆に-30℃を越えると、得られる共重合体の皮膜が硬くなりすぎて、実用性に乏しくなる傾向がある。

【0034】本発明は、このような共重合体を粘着剤として用い、表面基材に特定のフィルムを採用することにより、古紙のリサイクル工程に混入しても構わない表面基材にフィルムを用いた粘着シートが得られるものである。

【0035】発明において使用される剥離シートの基材としては、グラシン紙の如き高密度原紙、クレーコート紙、クラフト紙、または上質紙等に、例えばカゼイン、デキストリン、澱粉、カルボキシメチセルロース、メチセルロース、エチルセルロース、ヒドロキシエチルセルロース、ポリビニルアルコール、スチレン-ブタジエン共重合体、メチルメタクリレート-ブタジエン共重合体、エチレン-塩化ビニル共重合体、エチレン-酢酸ビニル共重合体、アクリル酸エステル共重合体などの、天然または合成樹脂と顔料とを主成分とした目止め層を設けたシート、クラフト紙または上質紙等にポリエチレン等をラミネートしたポリラミ紙、ポリプロピレンなどのフィルム等の剥離基材を用いることができる。またクラフト紙または上質紙等に、ポリ乳酸、乳酸またはラクチドとグリコール酸、ヒドロキシ酪酸、ヒドロキシ吉草酸、ヒドロキシベンタン酸、ヒドロキシカプロン酸、ヒドロキシヘプタン酸等のヒドロキシカルボン酸との共重合体等の乳酸系ポリマーをラミネートしたものや、これらの乳酸系ポリマーフィルム自体を用いても良い。そしてこれら剥離基材に、水分散型、溶剤型あるいは無溶剤型のシリコーン樹脂やフッ素樹脂等を乾燥重量で0.05～3g/m²程度塗被後、熱硬化、電離放射線硬化等によって剥離層を形成したものが使用される。

【0036】特に、剥離シートも含んだ粘着シートの構成で、リサイクル工程へ混入することを考慮すると、上記剥離基材の中で、クレーコート紙、クラフト紙、または上質紙等に、天然または合成樹脂と顔料とを主成分とした目止め層を乾燥重量で0.1～10g/m²程度設けた剥離基材、またはポリビニルアルコール、カルボキシメチセルロース、メチセルロース等の水溶性高分子より成形した水溶性フィルム、或いはポリ乳酸、乳酸またはラクチドとグリコール酸、ヒドロキシ酪酸、ヒドロキシ吉草酸、ヒドロキシベンタン酸、ヒドロキシカプロン酸、ヒドロキシヘプタン酸等のヒドロキシカルボン

11



12

(4)

【0046】(粘着剤の製造) まず乳化モノマー混合液として、

〔化4〕に示されるカルボン酸変性ロジンエステル：60部

メトキシジエチレングリコールメタクリレート：60部

アクリル酸ブチル：100部

アクリル酸-2-エチルヘキシル：100部

アクリル酸：40部

メタアクリル酸ジメチルアミノエチル：40部

アニオン系乳化剤(商品名:エマールNC-35, 花王社製)：6部

イオン交換水：150部

を混合して、調製した。次いで、実施例1と同様にして粘着剤を製造した。

(粘着シートの作成) 前記粘着剤を使用した以外は、実施例1と同様にして粘着シートを得た。

【0047】実施例3

(粘着剤の製造) まず乳化モノマー混合液として、

〔化3〕に示されるカルボン酸変性ロジンエステル：28部

メトキシジエチレングリコールメタクリレート：152部

アクリル酸ブチル：40部

アクリル酸-2-エチルヘキシル：100部

アクリル酸：60部

メタアクリル酸ジメチルアミノエチル：20部

アニオン系乳化剤(商品名:エマールNC-35, 花王社製)：6部

イオン交換水：150部

を混合して、調製した。次いで、実施例1と同様にして粘着剤を製造した。

(粘着シートの作成) 前記粘着剤を使用した以外は、実施例1と同様にして粘着シートを得た。

【0048】実施例4

剥離シートとして、下記に示す基材を用いた以外は実施例1と同様にして粘着シートを作成した。

(剥離シートの作成) 塗被液として、カオリン(商品名:UW-90, EMC社製)：15部、リン酸エステ*50

*ル化澱粉(商品名:ニールガムA-55C, アベ社製)：5部、ポリビニルアルコール(商品名:クラレPVA-103, クラレ社製)：80部、分散剤(商品名:アロンA-9, 東亞合成化学工業社製)：0.1部から成る組成物を、固形分濃度が40%となるように混合調製して市販の米坪64g/m²の上質紙の上に乾燥重量が5g/m²となるように塗被、乾燥して目止め層を設けた。次いで、スーパー・キャレンダーにて平滑仕上げを行い、剥離基材を得た。

【0049】次に、かくして得られた剥離基材の目止め層上に溶剤型のシリコーン剝離剤(商品名:LTC-300B, 東レ・ダウコーニング社製)：100部、触媒(商品名SRX-212, 東レ・ダウコーニング社製)：0.8部を乾燥重量が1.0g/m²となるよう塗被、熱硬化して剥離シートを得た。

【0050】実施例5

剥離シートの基材として、市販の米坪72g/m²のクラフト紙の上に厚みが20μmとなるようにポリ乳酸(商品名:ラクティー, 島津製作所社製)をラミネートした基材を用いた以外は実施例4と同様にして粘着シートを作成した。

【0051】実施例6

表面基材、剥離基材とともに、市販のポリ乳酸フィルム(商品名:ラクティー, 島津製作所社製)を用いた以外は実施例4と同様にして粘着シートを作成した。

【0052】実施例7

(粘着剤の製造) 乳化モノマー混合液として、〔化3〕に示されるカルボン酸変性ロジンエステル：150部

フェノキシジエチレングリコールアクリレート：20部

アクリル酸ブチル：60部

アクリル酸-2-エチルヘキシル：100部

アクリル酸：50部

メタアクリル酸ジメチルアミノエチル：20部

アニオン系乳化剤(商品名:エマールNC-35, 花王社製)：6部

イオン交換水：150部

を混合して、調製した。次いで、実施例1と同様にして

13

粘着剤を製造した。

(粘着シートの作成) 前記粘着剤を使用した以外は、実施例1と同様にして粘着シートを得た。

【0053】実施例8

(粘着剤の製造) 乳化モノマー混合液として、
〔化3〕に示されるカルボン酸変性ロジンエステル：60部
フェノキシジエチレングリコールアクリレート：70部
アクリル酸ブチル：60部
アクリル酸-2-エチルヘキシル：100部
アクリル酸：80部
メタアクリル酸ジメチルアミノエチル：30部
アニオン系乳化剤（商品名：エマールNC-35，花王社製）：6部
イオン交換水：150部

を混合して、調製した。次いで、実施例1と同様にして粘着剤を製造した。

(粘着シートの作成) 前記粘着剤を使用した以外は、実施例1と同様にして粘着シートを得た。

【0054】実施例9

(粘着剤の製造) 乳化モノマー混合液として、
〔化3〕に示されるカルボン酸変性ロジンエステル：80部
フェノキシジエチレングリコールアクリレート：20部
アクリル酸ブチル：100部
アクリル酸-2-エチルヘキシル：140部
アクリル酸：20部
メタアクリル酸ジメチルアミノエチル：40部
アニオン系乳化剤（商品名：エマールNC-35，花王社製）：6部
イオン交換水：150部

を混合して、調製した。次いで、実施例1と同様にして粘着剤を製造した。

(粘着シートの作成) 前記粘着剤を使用した以外は、実施例1と同様にして粘着シートを得た。

【0055】実施例10

(表面基材の作成) D, L-ラクチド100gおよびオクタン酸第1スズ0.01重量%とラウリルアルコール0.03重量%をガラス製重合管へ入れ、真空で1時間脱気した後封管した。この混合物封入管を200℃、4時間加熱し閉環重合させ、反応生成物としてポリ(D,L-乳酸)を得た。得られた樹脂の平均分子量は3万であった。得られた樹脂を二軸スクリューアウトモーティブ押出機を用いてペレット化した後、一軸押出機を用いて溶融押出し、厚さ50~60μmのフィルムを得た。

(粘着シートの作成) 前記表面基材を使用した以外は、実施例1と同様にして粘着シートを得た。

【0056】比較例1

表面基材として、市販のポリエチレンテレフタレートフィルム（東洋紡績株式会社製）を用いた以外は実施例1

14

と同様にして粘着シートを作成した。

【0057】比較例2

(粘着剤の製造) 乳化モノマー混合液として、
〔化3〕に示されるカルボン酸変性ロジンエステル：10部
メトキシジエチレングリコールメタクリレート：60部
アクリル酸ブチル：60部
アクリル酸-2-エチルヘキシル：200部
アクリル酸：20部

10 メタアクリル酸ジメチルアミノエチル：30部
アニオン系乳化剤（商品名：エマールNC-35，花王社製）：6部
イオン交換水：150部

を混合して、調製した。次いで、実施例1と同様にして粘着剤を製造した。

(粘着シートの作成) 前記粘着剤を使用した以外は、実施例1と同様にして粘着シートを得た。

【0058】比較例3

(粘着剤の製造) 乳化モノマー混合液として、
20 〔化3〕に示されるカルボン酸変性ロジンエステル：180部
メトキシジエチレングリコールメタクリレート：10部
アクリル酸ブチル：50部
アクリル酸-2-エチルヘキシル：60部
アクリル酸：10部

メタアクリル酸ジメチルアミノエチル：90部
アニオン系乳化剤（商品名：エマールNC-35，花王社製）：6部
イオン交換水：150部

30 を混合して、調製した。次いで、実施例1と同様にして粘着剤を製造した。

(粘着シートの作成) 前記粘着剤を使用した以外は、実施例1と同様にして粘着シートを得た。

【0059】比較例4

(粘着剤の製造)
乳化モノマー混合液として、
〔化3〕に示されるカルボン酸変性ロジンエステル：10部
メトキシジエチレングリコールメタクリレート：180部
アクリル酸ブチル：30部
アクリル酸-2-エチルヘキシル：30部
アクリル酸：140部

メタアクリル酸ジメチルアミノエチル：10部
アニオン系乳化剤（商品名：エマールNC-35，花王社製）：6部
イオン交換水：150部

を混合して、調製した。次いで、実施例1と同様にして粘着剤を製造した。

50 (粘着シートの作成) 前記粘着剤を使用した以外は、実

施例1と同様にして粘着シートを得た。

【0060】比較例5

粘着剤として、水およびアルカリ水溶液に不溶なアクリル系粘着剤（商品名：ニカゾールL-145、日本カーバイド工業株式会社製）を乾燥重量で22g/m²となるように塗被、乾燥した以外は、実施例1と同様にして粘着シートを作成した。

【0061】比較例6

表面基材として市販の水溶性フィルム（商品名：フレキシヌ、第一工業製薬株式会社製）を用いた以外は実施例1と同様にして粘着シートを作成した。

【0062】上記のようにして得られた粘着シートについて、下記の評価試験を行い、得られた結果を表1にまとめて示した。

【0063】（評価試験項目）

〔接着力〕JIS Z-0237の常態粘着力の測定方法に準拠し、SUS板およびガラス板に対する接着力を測定した。（単位：g/25mm）

【0064】（リサイクル適性評価）剥離シートも含んだ粘着シートの形態で、古紙リサイクル工程への混入を想定して、粘着シートそのものを評価用試料とした。シートを約20mm角の大きさにカットした試料45gに対して、水1500mlを加え、さらにNaOH1gを加えてTAPPI離解機にて150000回転処理した後、60メッシュのナイロンスクリーンで脱水し、残留物を再び5000mlの水に分散させ、18%濃度のNaOH水溶液を1.5g、脱墨剤（商品名：DI-600、花王社製）10%濃度溶液を1.8gそれぞれ添加後、55℃に保ちながら120分搅拌した。

【0065】次に、この分散液をフローテーターにて10分間浮上分離処理を行い、その際発生する泡をスクレーパーにて取り除き、もう一度60メッシュのナイロンスクリーンで脱水後、水1000mlで洗净し、残量物を水4500mlに分散させ手抄きシートを作成し、未離解物の残留状態を目視し下記評価基準にて判定した。

（リサイクル適性評価基準）

◎：未離解物がほとんどない。

○：未離解物が僅かにあるが、実用上問題ないレベル。

×：未離解物がかなり目立つ。

【0066】（粘着加工適正）剥離シートの剥離剤層側に粘着剤を塗工し、乾燥機にて乾燥させた後、粘着剤面の一辺と表面基材の一辺とを貼り合わせ、しっかりと固定し、表面基材を引っ張りながら粘着剤層と表面基材の裏

面とを貼り合わせ、粘着シートを作成し、熱収縮による表面基材へのシワの発生、あるいは表面基材の弾性又は伸びによる表面基材へのシワの発生について下記評価基準にて判定した。

（粘着加工適正評価基準）

○：粘着シート作成後、表面基材へのシワが発生しない。

△：粘着シート作成後、表面基材への少しシワが発生する。

×：粘着シート作成後、表面基材へのシワが発生する。

【0067】

【表1】

	接着力		リサイクル適性	粘着加工適性
	SUS板	ガラス板		
実施例1	1000	800	○	○
実施例2	1000	800	○	○
実施例3	900	750	○	○
実施例4	1000	800	○	○
実施例5	1000	800	◎	○
実施例6	1000	800	◎	○
実施例7	800	650	○	○
実施例8	900	700	○	○
実施例9	750	600	○	○
実施例10	1000	800	○	△
比較例1	900	700	×	○
比較例2	1000	750	×	○
比較例3	800	200	◎	○
比較例4	250	200	◎	○
比較例5	1400	700	×	○
比較例6	1000	800	◎	×

【0068】

【発明の効果】表1の如く、本発明の粘着シートは、表面基材にフィルムを使用しているにもかかわらず、製造の際にシワを生じることもなく、貼り付け時には必要な

接着力を示し、使用後、或いは未使用のまま古紙再生リサイクル工程に混入しても容易に分解或いは分散して工程外へ除去される粘着シートであった。

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TITLE: Adhesive sheet which does not crease during
prodn. - has surface base material of lactic acid polymer
which dis:aggregates with aq. alkali soln. and tacky
adhesive

PATENT-ASSIGNEE: OJI PAPER CO [OJIP]

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ABSTRACTED-PUB-NO: JP 08333550A

BASIC-ABSTRACT:

The adhesive sheet is laminate of a release sheet, a tacky adhesive layer and a surface base material. The surface base material is a film composed of lactic acid polymer and having disaggregation property for an aq. alkali soln.. The tacky adhesive has a copolymer layer obtd. by neutralisation of a carboxylic acid-modified rosin-contg. acrylic acid ester copolymer. The carboxylic acid-modified rosin-contg. acrylic acid ester copolymer comprises 5-40 wt.% (a) carboxylic acid-modified rosin ester monomer, 5-40 wt.% (b)

(poly)ethylene

glycol (meth)acrylate monomer, 30-46 wt.% (c) 4-18C alkyl ester monomer of (meth)acrylic acid, 5-20 wt.% (d) ethylenic unsatd. carboxylic acid-containing monomer and 5-20 wt.% (e) monomer copolymerisable with (a), (b), (c) and (d) above.

ADVANTAGE - The adhesive sheet does not creases during prodn. and displays good adhesive force. The adhesive sheet can be removed by decomposition or dispersion.

CHOSEN-DRAWING: Dwg. 0/0

TITLE-TERMS: ADHESIVE SHEET CREASE PRODUCE SURFACE BASE MATERIAL
LACTIC ACID

POLYMER DI AGGREGATE AQUEOUS ALKALI SOLUTION TACKIFIER
ADHESIVE

DERWENT-CLASS: A14 A23 A81 G03

CPI-CODES: A10-E01; A12-A01A; G02-A05D; G03-B04;

ENHANCED-POLYMER-INDEXING:

Polymer Index [1.1]

018 ; R00009 G2108 D01 D11 D10 D50 D60 D83 F27 F26 F36 F35 ;
H0000

; H0011*R ; P0839*R F41 D01 D63

Polymer Index [1.2]

018 ; B9999 B3010*R ; K9712 K9676

Polymer Index [1.3]

018 ; ND01 ; B9999 B3770 B3758 B3747 ; N9999 N5721*R ; N9999
N7192

N7023 ; Q9999 Q7818*R ; K9574 K9483 ; K9698 K9676 ; K9701 K9676
; Q9999 Q6644*R

Polymer Index [2.1]

018 ; G0986 G0975 D01 D51 D55 D11 D10 D16 D13 D07 D33 D79 D56 D59
D60 D63 D26 D95 F36 F35 F91 F41 ; G0373 G0340 G0339 G0260 G0022
D01 D12 D10 D26 D51 D53 D58 D63 F41 F89 G0419 G0384 D11 D95 F34
H0204 ; G0340*R G0339 G0260 G0022 D01 D12 D10 D26 D51 D53 D58 D63
F41 F89 D11 D87 D88 D89 D90 D91 D92 D93 D94 ; G0384*R G0339 G0260
G0022 D01 D12 D10 D26 D51 D53 D58 D63 F41 F89 D11 D88 D89 D90 D91
D92 D93 D94 ; G0022*R D01 D51 D53 G0817*R D54 G0975*R D55 D60
F35*R
; G0022*R D01 D51 D53 G0817*R D54 G0975*R D55 ; H0033 H0011 ;
M9999
M2415 ; P0088

Polymer Index [2.2]
018 ; G0419 G0384 G0339 G0260 G0022 D01 D12 D10 D26 D51 D53 D58
D63 F41 F89 D11 D89 F34 ; G0351*R G0340 G0339 G0260 G0022 D01 D11
D10 D12 D26 D51 D53 D58 D63 D87 F41 F89 ; R00745 G0340 G0339
G0260
G0022 D01 D11 D10 D12 D26 D51 D53 D58 D63 D91 F41 F89 ; R00446
G0282
G0271 G0260 G0022 D01 D12 D10 D26 D51 D53 D58 D60 D83 F36 F35 ;
R01606 G0384 G0339 G0260 G0022 D01 D11 D10 D12 D26 D51 D53 D58
D63
D88 F08 F07 F41 F89 ; H0033 H0011 ; L9999 L2528 L2506 ; L9999
L2551
L2506 ; M9999 M2415 ; L9999 L2391 ; L9999 L2415 ; M9999 M2835 ;
L9999 L2835 ; P0088

Polymer Index [2.3]
018 ; K9610 K9483

Polymer Index [2.4]
018 ; ND01 ; B9999 B3770 B3758 B3747 ; N9999 N5721*R ; N9999
N7192
N7023 ; Q9999 Q7818*R ; K9574 K9483 ; K9698 K9676 ; K9701 K9676
; Q9999 Q6644*R

Polymer Index [2.5]
018 ; R01713 D00 H* N* 5A ; H0226 ; H0226

Polymer Index [2.6]
018 ; D00 F48 K* 1A ; C999 C088*R C000 ; C999 C293

Polymer Index [2.7]
018 ; D01 D11 D10 D50 D88 F04 ; C999 C215 ; C999 C293

Polymer Index [2.8]
018 ; A999 A635 A624 A566 ; K9632 K9621

Polymer Index [3.1]
018 ; R00351 G1558 D01 D23 D22 D31 D42 D50 D73 D82 F47 ; H0000 ;
P8004 P0975 P0964 D01 D10 D11 D50 D82 F34 ; P0055 ; H0191 ; M9999
M2017 ; M9999 M2153*R ; M9999 M2186 ; M9999 M2813

Polymer Index [4.1]
018 ; G0986 G0975 D01 D51 D55 D11 D10 D16 D13 D07 D33 D79 D56 D59
D60 D63 D26 D95 F36 F35 F91 F41 ; H0271 ; L9999 L2471 ; L9999
L2017
; L9999 L2186*R ; L9999 L2813 ; L9999 L2062 ; L9999 L2744 L2733

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1997-030692

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TECHNICAL FIELD

[Industrial Application] This invention relates to the pressure sensitive adhesive sheet which can be disaggregated easily and which may be mixed in a recycle process, without a binder and a film doing an adverse effect in detail, about the pressure sensitive adhesive sheet which used the film for the surface base material, in case pulp is reproduced.

[Translation done.]

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MEANS

[Means for Solving the Problem] This invention is the pressure sensitive adhesive sheet characterized by to be the binder with which it has disaggregation nature to an alkali water solution, and a surface base material is the copolymer which neutralized the carboxylic-acid denaturation rosin content acrylic-ester copolymer with which it is the film which consists of a lactic-acid system polymer, and the binder which constitutes a binder layer consists of the following presentation with the alkaline substance, and has re-disaggregation nature to water or an alkali water solution in the pressure sensitive adhesive sheet which comes to carry out the laminating of an exfoliation sheet, a binder layer, and the surface base material.

(a) A carboxylic-acid denaturation rosin ester monomer .. 5 - 40 % of the weight (b) (Pori) ethylene glycol (meta) acrylate monomer .. C4 of a 5 - 40-% of the weight (c) (meta) acrylic acid - C18 alkyl ester monomer .. 30 - 60 % of the weight (d) ethylene nature unsaturated-carboxylic-acid content monomer .. Monomer in which the 5 - 20-% of the weight (e) above a, b, c, and d and copolymerization are possible .. 5 - 20 % of the weight

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] Without producing Siwa on the occasion of manufacture, although the pressure sensitive adhesive sheet of this invention was using the film for the surface base material as shown in a table 1, after an activity while it had been intact, even if adhesive strength required at the time of attachment was shown, and it mixed in the used paper playback recycle process, it was the pressure sensitive adhesive sheet which decomposes or distributes easily and is removed out of a process.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention solves the above-mentioned problem, even if mixed in common used paper, disaggregation of it is carried out easily, and it offers the pressure sensitive adhesive sheet which used the film for the surface base material which does not have an adverse effect on playback pulping.

[Translation done.]

pressure sensitive adhesive sheet which used plastic films, such as polyethylene, a polyvinyl chloride, polystyrene, and polyethylene terephthalate, for the surface base material has especially had the adverse effect on the playback pulping process while it is difficult to remove. The actual condition is that the used paper containing the pressure sensitive adhesive sheet which used the film as the surface base material in the actual condition separates only a pressure sensitive adhesive sheet from the inside of the collected journal manually one by one, for example, and is processing it as industrial waste.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] The object for commerce, the object for clerical work, home use, etc. reach far and wide dramatically, and the pressure sensitive adhesive sheet is used, processing it into a label, a seal, a sticker, an emblem, etc. The general configuration of a pressure sensitive adhesive sheet forms a binder layer between a surface base material and an exfoliation sheet, paper, a film, the metal foil, etc. are used for a surface base material, and what applied the remover like a silicone compound or a fluoride to a high density stencil like glassine as an exfoliation sheet, clay court paper, a polyethylene lamination stencil, etc. is used for it. Moreover, as a binder, emulsions, such as a rubber system, acrylic, and a vinyl ether system, a solvent, or the various binders of a non-solvent mold are used. There is this pressure sensitive adhesive sheet with the thing of the re-exfoliation type exfoliated and canceled, after attaining the object of a display from the thing of the permanent adhesion type used permanently, stuck to adherend after being stuck on goods etc., and the relation of goods etc.

[0003] On the other hand, about recycle of used paper, as a raw material for pulp manufacture, the amount of the used paper used containing the maculature for playback is over paper and 50% of a paper board production raw material, and in current our country, by the time it already occupies the location of the main raw material, it will have become. The used paper in which playback pulping is possible is upper white, a card, ****, inside white, white Manila, a ticket, inside ******, tea simili paper (**** is included), pasteboard, a certificate of land title, a ball, a thermographic recording paper, back-coated paper, an OCR form, etc. on a newspaper, corrugated paper, a journal, imitation, and a color (an art is included). Playback pulping is performed through the disaggregation process which the playback pulping method from these used paper generally disaggregates used paper, and obtains pulp suspension, roughing which separates the foreign matter in pulp suspension, a careful selection process, the deinking process which separates printing ink, and the bleaching process which makes a color white.

[0004] However, the paper which carried out wax processing, the paper which gave the polyethylene lamination, a pressure sensitive adhesive sheet, etc. cannot separate an insoluble wax, polyethylene, a binder, etc. into water from pulp fiber, but let them be used paper with difficult playback pulping. The insoluble binder is contained in water no less than 5 to 50%, and further, since this binder has strong adhesion, separation from pulp fiber especially of the case of a pressure sensitive adhesive sheet is made impossible.

[0005] While the binder had been contained in playback pulp, when paper making is carried out using this playback pulp, at a paper-making process, a binder closes the eye of a wire, or a press roll and a blanket are soiled, it becomes the cause of raising a slip of paper etc., and there is a problem of doing an adverse effect in respect of paper formation, such as the problem of reducing paper-making effectiveness remarkably arising, or forming a spot on space, or quality.

[0006] Or disaggregation is not carried out, disaggregation was hardly carried out, but the

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Industrial Application] This invention relates to the pressure sensitive adhesive sheet which can be disaggregated easily and which may be mixed in a recycle process, without a binder and a film doing an adverse effect in detail, about the pressure sensitive adhesive sheet which used the film for the surface base material, in case pulp is reproduced.

[0002]

[Description of the Prior Art] The object for commerce, the object for clerical work, home use, etc. reach far and wide dramatically, and the pressure sensitive adhesive sheet is used, processing it into a label, a seal, a sticker, an emblem, etc. The general configuration of a pressure sensitive adhesive sheet forms a binder layer between a surface base material and an exfoliation sheet, paper, a film, the metal foil, etc. are used for a surface base material, and what applied the remover like a silicone compound or a fluoride to a high density stencil like glassine as an exfoliation sheet, clay court paper, a polyethylene lamination stencil, etc. is used for it. Moreover, as a binder, emulsions, such as a rubber system, acrylic, and a vinyl ether system, a solvent, or the various binders of a non-solvent mold are used. There is this pressure sensitive adhesive sheet with the thing of the re-exfoliation type exfoliated and canceled, after attaining the object of a display from the thing of the permanent adhesion type used permanently, stuck to adherend after being stuck on goods etc., and the relation of goods etc.

[0003] On the other hand, about recycle of used paper, as a raw material for pulp manufacture, the amount of the used paper used containing the maculature for playback is over paper and 50% of a paper board production raw material, and in current our country, by the time it already occupies the location of the main raw material, it will have become. The used paper in which playback pulping is possible is upper white, a card, ****, inside white, white Manila, a ticket, inside ******, tea simili paper (**** is included), pasteboard, a certificate of land title, a ball, a thermographic recording paper, back-coated paper, an OCR form, etc. on a newspaper, corrugated paper, a journal, imitation, and a color (an art is included). Playback pulping is performed through the disaggregation process which the playback pulping method from these used paper generally disaggregates used paper, and obtains pulp suspension, roughing which separates the foreign matter in pulp suspension, a careful selection process, the deinking process which separates printing ink, and the bleaching process which makes a color white.

[0004] However, the paper which carried out wax processing, the paper which gave the polyethylene lamination, a pressure sensitive adhesive sheet, etc. cannot separate an insoluble wax, polyethylene, a binder, etc. into water from pulp fiber, but let them be used paper with difficult playback pulping. The insoluble binder is contained in water no less than 5 to 50%, and further, since this binder has strong adhesion, separation from pulp fiber especially of the case of a pressure sensitive adhesive sheet is made impossible.

[0005] While the binder had been contained in playback pulp, when paper making is carried out using this playback pulp, at a paper-making process, a binder closes the eye of a wire, or a press roll and a blanket are soiled, it becomes the cause of raising a slip of paper etc., and there is a problem of doing an adverse effect in respect of paper formation, such as the problem of reducing paper-making effectiveness remarkably arising, or forming a spot on space, or quality.

[0006] Or disaggregation is not carried out, disaggregation was hardly carried out, but the pressure sensitive adhesive sheet which used plastic films, such as polyethylene, a polyvinyl chloride, polystyrene, and polyethylene terephthalate, for the surface base material has especially had the adverse effect on the playback pulping process while it is difficult to remove. The actual condition is that the used paper containing the pressure sensitive adhesive sheet which used the film as the surface base material in the actual condition separates only a pressure sensitive adhesive sheet from the inside of the collected journal manually one by one, for example, and is processing it as industrial waste.

[0007]

[Problem(s) to be Solved by the Invention] This invention solves the above-mentioned problem, even if mixed in common used paper, disaggregation of it is carried out easily, and it offers the pressure sensitive adhesive sheet which used the film for the surface base material which does not have an adverse effect on playback pulping.

[0008]

[Means for Solving the Problem] This invention is the pressure sensitive adhesive sheet characterized by to be the binder with which it has disaggregation nature to an alkali water solution, and a surface base material is the copolymer which neutralized the carboxylic-acid denaturation rosin content acrylic-ester copolymer with which it is the film which consists of a lactic-acid system polymer, and the binder which constitutes a binder layer consists of the following presentation with the alkaline substance, and has re-disaggregation nature to water or an alkali water solution in the pressure sensitive adhesive sheet which comes to carry out the laminating of an exfoliation sheet, a binder layer, and the surface base material.

(a) A carboxylic-acid denaturation rosin ester monomer .. 5 - 40 % of the weight (b) (Pori) ethylene glycol (meta) acrylate monomer .. C₄ of a 5 - 40-% of the weight (c) (meta) acrylic acid - C₁₈ alkyl ester monomer .. 30 - 60 % of the weight (d) ethylene nature unsaturated-carboxylic-acid content monomer .. Monomer in which the 5 - 20-% of the weight (e) above a, b, c, and d and copolymerization are possible .. 5 - 20 % of the weight [0009]

[Function] The film which consists of a lactic-acid system polymer as a surface base material is used for this invention. Although the film which has disaggregation nature to an alkali water solution called the condensation product of the polymer of hydroxycarboxylic acid, such as a copolymer of polyhydroxy butanoic acid, or a hydroxybutyric acid and a hydroxy valeric acid and Pori (3-hydroxy alkanoate), polybutylene succinate, polyethylene succinate, or a them and a succinic acid is also considered in order to solve the technical problem of this invention, a film is opaque, and these have a possibility that it may be elastic and a wrinkling may occur at the time of adhesion processing, and the quality as a pressure sensitive adhesive sheet is inadequate.

[0010] As an example of a lactic-acid system polymer, a copolymer with hydroxycarboxylic acid, such as polylactic acid, a lactic acid or a lactide and a glycolic acid, hydroxybutyric acid, a hydroxy valeric acid, hydroxy pentanoic acid, a hydroxy caproic acid, and hydroxy oenanthic acid, etc. can be mentioned. Both Pori (L-lactic acid) which consists only of L-lactic acid Pori (D-lactic acid) which consists only of a D-lactic acid and Pori (DL-lactic acid) where the both stand in a row at a various rate can be used for the configuration unit of polylactic acid.

[0011] The lactic-acid system polymer used preferably can be obtained by carrying out

dehydration condensation of the raw material monomer, or carrying out ring opening polymerization of the cyclic ester, such as the lactide which is the annular dimer of a lactic acid and glycolide, a caprolactone, propiolactone, a butyrolactone, and a valerolactone. In addition, as for the molecular weight of a polymer, it is desirable that it is 50,000 to about 1 million in weight average molecular weight. Incidentally, when molecular weight does not fulfill 50,000, it is in the inclination for physical reinforcement and heat-resistant dimensional stability to worsen, and is not suitable for adhesion processing. moreover -- if molecular weight exceeds 1 million -- a film -- steel -- it becomes direct too much and is not suitable for adhesion processing too.

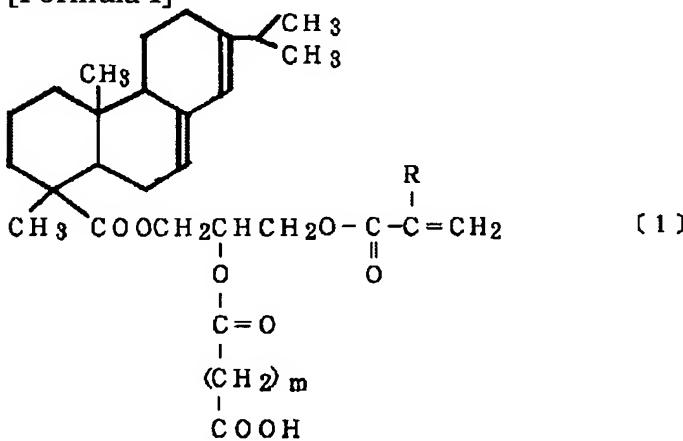
[0012] This surface base material prepares a sensible-heat coloring layer, an ink absorbing layer, etc., various processings currently performed in the field of the pressure sensitive adhesive sheet may give it, for example, it may prepare a pigment application layer, may prepare [**** / improving printing **** / the function as various record objects may be given or] a concealment layer etc., and even if it performs coloring and printing further, it is not cared about.

[0013] The binder used in the pressure sensitive adhesive sheet of this invention (a) carboxylic-acid denaturation rosin ester monomer .. 5 - 40 % of the weight (b) (Pori) ethylene glycol (meta) acrylate monomer .. C₄ of a 5 - 40-% of the weight (c) (meta) acrylic acid - C₁₈ alkyl ester monomer .. 30 - 60 % of the weight (d) ethylene nature unsaturated-carboxylic-acid content monomer .. Monomer in which the 5 - 20-% of the weight (e) above a, b, c, and d and copolymerization are possible .. It is the copolymer which neutralized with alkali the carboxylic-acid denaturation rosin content acrylic ester copolymer which consists of 5 - 20% of the weight of a presentation.

[0014] As this (a) carboxylic-acid denaturation rosin ester monomer, the compound expressed to the following general formula 1 can be illustrated.

[0015]

[Formula 1]



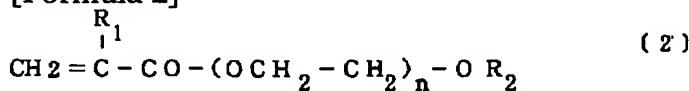
[0016] As for R, a methyl group or a hydrogen atom, and m show the integer of 1-8 among [type.]

[0017] In addition, it is necessary to carry out copolymerization of the carboxylic-acid denaturation rosin ester monomer in 5 - 40% of the weight of the range. Incidentally, at less than 5 % of the weight, **** disaggregation nature serves as imperfection. On the other hand, if 40 % of the weight is exceeded, the cohesive force of a binder will become scarce and the function of a pressure sensitive adhesive sheet will fall.

[0018] Moreover, as a (b) (Pori) ethylene glycol (meta) acrylate monomer, the compound expressed to the following general formula 2 can be illustrated.

[0019]

[Formula 2]



[0020] Among [type, in R1, a methyl group or a hydrogen atom, and R2 show a methyl group, a phenyl group, an acryloyl radical, or a meta-KURORIRU radical, and n shows the integer of 1-10.]

[0021] In addition, it is necessary to carry out copolymerization of the ethylene glycol (Pori) (meta) acrylate monomer in 5 - 40% of the weight of the range. Incidentally at less than 5 % of the weight, the disaggregation nature to an alkali water solution serves as imperfection. On the other hand, if it exceeds 40 % of the weight, the cohesive force of a binder will decline and the function of a pressure sensitive adhesive sheet will fall.

[0022] Moreover, as an example of C4 of the (c) (meta) acrylic acid - C18 alkyl ester monomer, butyl acrylate (meta), acrylic-acid (meta) hexyl, acrylic-acid (meta) octyl, 2-ethylhexyl acrylate (meta), acrylic-acid (meta) stearyl, etc. are mentioned. And copolymerization of the rate of occupying into the copolymer part of this monomer is carried out in 30 - 60% of the weight of the range. Incidentally, at less than 30 % of the weight, if the adhesion of a binder becomes scarce and exceeds 60 % of the weight, **** disaggregation nature will serve as imperfection.

[0023] Moreover, as an example of (d) ethylene nature unsaturated-carboxylic-acid content monomer, an acrylic acid, a methacrylic acid, a crotonic acid, a maleic acid, a fumaric acid, a monoalkyl maleic acid, a monoalkyl itaconic acid, a monoalkyl fumaric acid, etc. are mentioned. And copolymerization of the rate of occupying into the copolymer part of this monomer is carried out in 5 - 20% of the weight of the range. Incidentally, at less than 5 % of the weight, if the cohesive force of a binder becomes scarce and exceeds 20 % of the weight, the adhesion of a binder will serve as imperfection.

[0024] furthermore, as an example of other monomers in which (e) above (a), (b), (c) and (d), and copolymerization are possible A methyl acrylate, an ethyl acrylate (meta), acrylic-acid (meta) propyl, (Meta) Acrylic-acid cyclohexyl, acrylic-acid (meta) methoxy ethyl, (Meta) Acrylic-acid ethoxyethyl, acrylic-acid (meta) dimethylaminoethyl, (Meta) An acrylic-acid diethylaminoethyl, metaglycidyl acrylate (meta), (Meta) Vinyl acetate, propionic-acid vinyl, a vinyl chloride, a vinylidene chloride, styrene, Divinylbenzene, ethylene, acrylonitrile (meta), acrylamide (meta), N-butoxy methyl (meta) acrylamide, N, and N'-methylenebis (meta) acrylamide etc. is mentioned. And the rate of the monomer which is occupied to a copolymer and in which these copolymerization is possible is adjusted in 5 - 20% of the weight of the range.

[0025] In addition, methyl-acrylate (meta), acrylic-acid (meta) dimethylaminoethyl, metaglycidyl acrylate (meta), divinylbenzene, acrylonitrile (meta), acrylamide (meta), N-methoxymethyl (meta) acrylamide, N-butoxy methyl (meta) acrylamide, N, and N'-methylenebis (meta) acrylamide etc. is especially desirable from fields, such as cross-linking, glass transition temperature, and adhesive ability, also in other monomers (e) in which these copolymerization is possible.

[0026] If here explains briefly the role of each above-mentioned monomer to the binder of this invention As a component which gives the water redispersible of a binder, both (a) carboxylic-acid denaturation rosin ester monomer and (b) (Pori) ethylene glycol (meta) acrylate monomer are important. Next, as a component which gives the adhesiveness of a binder, C4 of the (c) (meta) acrylic acid - C18 alkyl ester monomer are important, and (d) ethylene nature unsaturated-carboxylic-acid content monomer is important as a component which gives the cohesive force of a binder further.

[0027] therefore, in order to obtain the binder which re-disaggregation nature is excellent in,

and has good adhesive ability to water like this invention. The above-mentioned (a) carboxylic-acid denaturation rosin ester monomer, (b) (Pori) ethylene glycol (meta) acrylate monomer, (c) (meta) -- C₄ of an acrylic acid - C₁₈ alkyl ester monomer, (d) ethylene nature unsaturated-carboxylic-acid content monomer, and (e) -- the balance of combination of other monomers in which they and copolymerization are possible is very important.

[0028] In addition, especially about the manufacture approach of the above-mentioned copolymer, it is not limited and is manufactured by the approach that the approach of carrying out emulsion polymerization by the drainage system under existence of the approach of carrying out solution polymerization under existence of water, a solvent, a chain transfer agent, a polymerization initiator, etc., an emulsifier, a chain transfer agent, a polymerization initiator, a dispersant, etc. is well-known.

[0029] About 40 - 60 % of the weight is usually preferably suitable for the monomer concentration at the time of a polymerization 30 to 70% of the weight. Moreover, as a polymerization initiator used in the case of a polymerization, the polymerization initiator of the so-called redox system which consists of combination with peroxides, such as azo system compounds, such as - azobisisobutyronitril, and persulfate [, such as potassium persulfate and ammonium persulfate,], 2, and 2 '2, 2'-azobis (2,4-dimethylvaleronitrile), a hydrogen peroxide, benzoyl peroxide, and lauryl peroxide, ammonium persulfate and sodium sulfite, acid sodium sulfite, etc., for example is mentioned. the monomer whole quantity which usually ** the amount of the polymerization initiator used to a polymerization -- receiving -- 0.2 - 2 weight section -- it is more preferably adjusted in the range of 0.3 - 1 weight section.

[0030] Furthermore, as a chain transfer agent added on the occasion of copolymerization, thioglycolic acid ester, such as alkyl mercaptan, such as an octyl mercaptan, a nonyl mercaptan, a DESHIRU mercaptan, and dodecyl mercaptan, thioglycolic acid octyl, thioglycolic acid nonyl, 2-ethylhexyl thioglycolate, and beta-mercaptopropionic acid-2-ethylhexyl, 2, 4-diphenyl-4-methyl-1-pentene, a 1-methyl-4-isopropylidene-1-cyclohexene, etc. can be mentioned. The copolymer obtained becomes a low odor and is desirable when thioglycolic acid ester, 2, 4-diphenyl-4-methyl-1-pentene, and a 1-methyl-4-isopropylidene-1-cyclohexene are used especially. In addition, the amount of the chain transfer agent used is adjusted in the range of 0.001 - 3 weight section extent of all the monomers that carry out a polymerization.

[0031] In addition, a polymerization reaction is usually performed over 2 - 8 hours under 60-100-degree C temperature conditions. Furthermore, **** addition of a wetting agent, a leveling agent, a thickener, a defoaming agent, the antiseptics, etc. can be carried out.

[0032] The water redispersible of the copolymer coat which the copolymer obtained by the above-mentioned approach gave water solubility by neutralizing the carboxyl group in the copolymer with suitable alkaline substances, such as a sodium hydroxide, a potassium hydroxide, ammonia, the 1st class of various kinds of, the 2nd class, and tertiary amine, therefore was obtained appears.

[0033] The glass transition temperature of the above-mentioned copolymer is the thing of the range of -60--30 degree C, and **** selection is made according to the object. When the cohesive force of the coat obtained becomes inadequate incidentally if the glass transition temperature of a copolymer becomes less than -60 degrees C and -30 degrees C is exceeded conversely, the coat of the copolymer obtained becomes hard too much, and the inclination which becomes scarce is in practicability.

[0034] When this invention adopts a specific film as a surface base material, using such a copolymer as a binder, the pressure sensitive adhesive sheet which used the film for the surface base material which may be mixed in the recycle process of used paper is obtained.

[0035] As a base material of the exfoliation sheet used in invention To the high density stencil

like glassine, clay court paper, kraft paper, or paper of fine quality. For example, casein, a dextrin, starch, a carboxymethyl cellulose, methyl cellulose, ethyl cellulose, hydroxyethyl cellulose, polyvinyl alcohol, a styrene-butadiene copolymer, a methyl methacrylate-butadiene copolymer, An ethylene-vinyl chloride copolymer, an ethylene-vinylacetate copolymer, an acrylic ester copolymer, etc., Exfoliation base materials which laminated polyethylene etc., such as films, such as a polylaminated paper and polypropylene, can be used for a sheet, kraft paper, or paper of fine quality etc. which prepared the filling layer which used nature or synthetic resin, and a pigment as the principal component. Moreover, what laminated lactic-acid system polymers, such as a copolymer with hydroxycarboxylic acid, such as polylactic acid, a lactic acid or a lactide and a glycolic acid, hydroxybutyric acid, a hydroxy valeric acid, hydroxy pentanoic acid, a hydroxy caproic acid, and hydroxy oenanthic acid, and these lactic-acid system polymer film itself may be used for kraft paper or paper of fine quality. And to these exfoliation base material, it is silicone resin, a fluororesin, etc. of a moisture powder type, a solvent mold, or a non-solvent mold at dry weight 0.05 - 3 g/m². What formed stratum disjunctum by heat curing, ionizing-radiation hardening, etc. is used after an extent application.

[0036] When it takes mixing to a recycle process into consideration with the configuration of the pressure sensitive adhesive sheet which also contained the exfoliation sheet especially, in the above-mentioned exfoliation base material It is the filling layer which used nature or synthetic resin, and a pigment as the principal component at clay court paper, kraft paper, or paper of fine quality at dry weight 0.1 - 10 g/m². A grade The formed exfoliation base material, Or the water soluble film fabricated from water soluble polymers, such as polyvinyl alcohol, a carboxymethyl cellulose, and methyl cellulose, Or polylactic acid, a lactic acid or a lactide and a glycolic acid, hydroxybutyric acid, A hydroxy valeric acid, hydroxy pentanoic acid, a hydroxy caproic acid, The exfoliation base material which becomes a lactic-acid system polymer film, kraft paper, or paper of fine quality hydrolyzed in the alkali water solution fabricated from the copolymer with hydroxycarboxylic acid, such as hydroxy oenanthic acid, from what laminated the above-mentioned lactic-acid system polymer is desirable.

[0037] By there being no definition according to rank about the approach of constituting a pressure sensitive adhesive sheet, and following a conventional method, applying a binder and drying on the remover stratification plane of an exfoliation sheet, a binder layer is formed, and a surface base material is stuck and it is finished. In this case, although a binder usually adjusts to the viscosity of 10 - 8,000 centipoise extent and is applied to an exfoliation sheet by means, such as accommodation of molecular weight, dilution by water, or thickening As application equipment in this case, for example A reverse roll coater, a knife coating machine, An air knife coater, a bar coating machine, a slot die coating machine, a lip coating machine, a reverse gravure coating machine, etc. are used, and the amount of applications of a binder is 5 - 50 g/m². It is adjusted in the range of extent. Incidentally, it is 5 g/m². The adhesive ability of the pressure sensitive adhesive sheet obtained becomes inadequate in the following, and, on the other hand, they are 50 g/m². If it exceeds, a binder will overflow at the time of the lamination of a pressure sensitive adhesive sheet, or there is a possibility of becoming the cause of cohesive failure, in the case of exfoliation.

[0038]

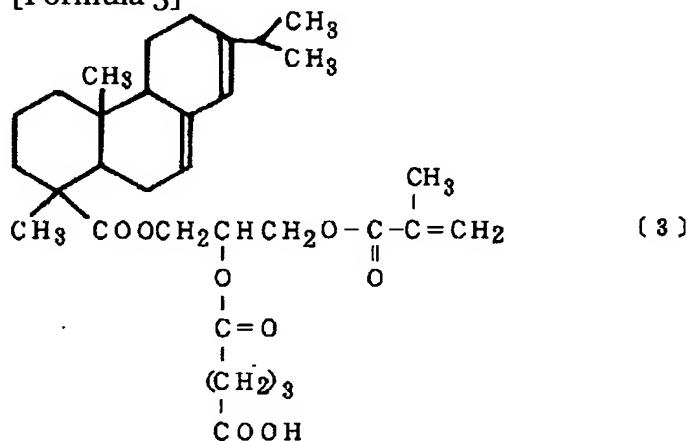
[Example] Although an example is given and this invention is explained more concretely hereafter, of course, this invention is not limited to these. Moreover, comparatively, especially the amounts of applications etc. are the section in an example, and a thing altogether shown by solid content weight, unless it refuses.

[0039] Temperature up of the methacrylic acid was carried out to 100 degrees C under nitrogen gas by teaching 70g and epichlorohydrin 90g, and it maintained at the flask which

attached example 1 (composition of carboxylic-acid denaturation rosin ester) agitator, the exhaust pipe, the dropping funnel, the nitrogen suction pipe, and the thermometer for 2 hours. Subsequently, 300g added and the abietic-acid rosin in which it was made to fully dissolve was maintained at 230 degrees C for 2 hours. Subsequently, 125g of anhydrous guru tongue acids was added, and the carboxylic-acid denaturation rosin ester which maintains at 230 degrees C for 2 hours, and is shown in following [-ized 3] was compounded.

[0040]

[Formula 3]



[0041] Carboxylic-acid denaturation rosin-ester:60 section methoxy diethylene-glycol methacrylate:60 section butyl-acrylate:100 section 2-ethylhexyl-acrylate:100 section acrylic-acid:40 section methacrylic-acid dimethylaminoethyl first shown in [-izing 3] as emulsification monomer mixed liquor: (Manufacture of a binder) The 40 section anion system emulsifier (trade name: EMARU NC-35, Kao Corp. make):6 section ion-exchange-water:150 section was mixed and prepared.

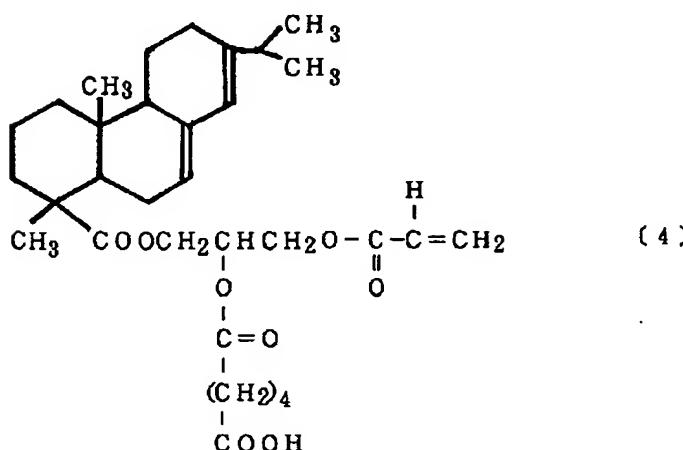
[0042] After carrying out temperature up to 80 degrees C, teaching and carrying out the nitrogen purge of the ion-exchange-water 150 section, the potassium peroxide 3 section, and the octyl mercaptan 3 section to the flask which attached an agitator, the cooler, the dropping funnel, the nitrogen suction pipe, and the thermometer next, the above-mentioned emulsification monomer mixed liquor was dropped 1/6. When conversion reached to 90%, the remaining monomer mixed liquor was dropped over 3 hours, and the polymerization was performed. After dropping termination, it ripened at 80 degrees C for 3 hours, and the reaction was completed. Next, flask contents were cooled at 40 degrees C, it counteracted by having added aqueous ammonia, and the binder which strong-agitates after reaction termination and is used for this invention was manufactured.

[0043] (Creation of a pressure sensitive adhesive sheet) It is the above-mentioned binder at dry weight to a commercial clay court releasing paper 22 g/m² After making it apply and dry so that it may become, this binder stratification plane and a commercial polylactic acid film (trade name: Lacty, Shimadzu make) rear face were stuck, and the pressure sensitive adhesive sheet was created.

[0044] The carboxylic-acid denaturation rosin ester which shows an acrylic acid to following [-ized 4] like an example 1 instead of 60g and an anhydrous guru tongue acid instead of example 2 (composition of carboxylic-acid denaturation rosin ester) methacrylic acid except having set the anhydrous adipic acid to 140g was compounded.

[0045]

[Formula 4]



[0046] Carboxylic-acid denaturation rosin-ester:60 section methoxy diethylene-glycol methacrylate:60 section butyl-acrylate:100 section 2-ethylhexyl-acrylate:100 section acrylic-acid:40 section methacrylic-acid dimethylaminoethyl first shown in [-izing 4] as emulsification monomer mixed liquor: (Manufacture of a binder) The 40 section anion system emulsifier (trade name: EMARU NC-35, Kao Corp. make):6 section ion-exchange-water:150 section was mixed and prepared. Subsequently, the binder was manufactured like the example 1. (Creation of a pressure sensitive adhesive sheet) The pressure sensitive adhesive sheet was obtained like the example 1 except having used said binder.

[0047] an example 3 (manufacture of a binder) -- the carboxylic-acid denaturation rosin ester:28 section methoxy diethylene-glycol methacrylate:152 section butyl acrylate:40 section 2-ethylhexyl acrylate:100 section acrylic-acid:60 section methacrylic acid dimethylaminoethyl:20 section anion system emulsifier (trade name: EMARU NC-35, Kao Corp. make):6 section ion-exchange-water:150 section shown in [-izing 3] was first mixed and prepared as emulsification monomer mixed liquor. Subsequently, the binder was manufactured like the example 1.

(Creation of a pressure sensitive adhesive sheet) The pressure sensitive adhesive sheet was obtained like the example 1 except having used said binder.

[0048] The pressure sensitive adhesive sheet was created like the example 1 except having used the base material shown below as an example 4 exfoliation sheet.

As application liquid, the kaolin (trade name: UW-90, EMC company make):15 section, (Creation of an exfoliation sheet) Phosphoric ester-ized starch (trade name: knee RUGAMU A-55C, made in Abebe) : The five sections, Polyvinyl alcohol (trade name: Kuraray PVA-103, Kuraray Co., Ltd. make) : The 80 sections, Dispersant (trade name: made in [Toagosei Chemical Industry Co., Ltd.] Aron A-9): Carry out mixed preparation of the constituent which consists of the 0.1 sections so that solid content concentration may become 40%, and it is commercial U.S. tsubo 64 g/m². Dry weight is 5 g/m² on paper of fine quality. It applied, and it dried and the filling layer was prepared so that it might become. Subsequently, the super calender performed smooth finishing and the exfoliation base material was obtained.

[0049] Next, dry weight is the silicone remover (trade name: LTC-300B, Toray Industries Dow Corning make):100 section of a solvent mold, and the catalyst (trade name SRX-212, Toray Industries Dow Corning make):0.8 section on the filling layer of the exfoliation base material obtained in this way 1.0g/m² It applied, and it heat-hardened and the exfoliation sheet was obtained so that it might become.

[0050] As a base material of an example 5 exfoliation sheet, it is commercial U.S. tsubo 72 g/m². The pressure sensitive adhesive sheet was created like the example 4 except having used the base material which laminated polylactic acid (trade name: Lacty, Shimadzu make) so that

thickness might be set to 20 micrometers on kraft paper.

[0051] The example 6 surface base material and the exfoliation base material created the pressure sensitive adhesive sheet like the example 4 except having used the commercial polylactic acid film (trade name: Lacty, Shimadzu Corp. make).

[0052] Carboxylic-acid denaturation rosin-ester:150 section phenoxy diethylene-glycol acrylate:20 section butyl-acrylate:60 section 2-ethylhexyl-acrylate:100 section acrylic-acid:50 section methacrylic-acid dimethylaminoethyl shown in [-izing 3] as example 7 (manufacture of a binder) emulsification monomer mixed liquor: The 20 section anion system emulsifier (trade name: EMARU NC-35, Kao Corp. make):6 section ion-exchange-water:150 section was mixed and prepared. Subsequently, the binder was manufactured like the example 1.

(Creation of a pressure sensitive adhesive sheet) The pressure sensitive adhesive sheet was obtained like the example 1 except having used said binder.

[0053] Carboxylic-acid denaturation rosin-ester:60 section phenoxy diethylene-glycol acrylate:70 section butyl-acrylate:60 section 2-ethylhexyl-acrylate:100 section acrylic-acid:80 section methacrylic-acid dimethylaminoethyl shown in [-izing 3] as example 8 (manufacture of a binder) emulsification monomer mixed liquor: The 30 section anion system emulsifier (trade name: EMARU NC-35, Kao Corp. make):6 section ion-exchange-water:150 section was mixed and prepared. Subsequently, the binder was manufactured like the example 1.

(Creation of a pressure sensitive adhesive sheet) The pressure sensitive adhesive sheet was obtained like the example 1 except having used said binder.

[0054] Carboxylic-acid denaturation rosin-ester:80 section phenoxy diethylene-glycol acrylate:20 section butyl-acrylate:100 section 2-ethylhexyl-acrylate:140 section acrylic-acid:20 section methacrylic-acid dimethylaminoethyl shown in [-izing 3] as example 9 (manufacture of a binder) emulsification monomer mixed liquor: The 40 section anion system emulsifier (trade name: EMARU NC-35, Kao Corp. make):6 section ion-exchange-water:150 section was mixed and prepared. Subsequently, the binder was manufactured like the example 1.

(Creation of a pressure sensitive adhesive sheet) The pressure sensitive adhesive sheet was obtained like the example 1 except having used said binder.

[0055] The sealed tube was carried out, after putting in example 10(creation of surface base material) D, and L-lactide 100g and the 0.01 % of the weight of the 1st tin of an octanoic acid, and 0.03 % of the weight of lauryl alcohol to glass polymerization tubing and deaerating it under vacuum for 1 hour. 200 degrees C, this mixture enclosure tubing is heated for 4 hours, and carried out ring opening polymerization, and Pori (D, L-lactic acid) was obtained as a resultant. The average molecular weight of the obtained resin was 30,000. After pelletizing the obtained resin using a 2 shaft SUKURYUU extruder, melting extrusion and a film with a thickness of 50-60 micrometers were obtained using the 1 shaft extruder.

(Creation of a pressure sensitive adhesive sheet) The pressure sensitive adhesive sheet was obtained like the example 1 except having used said surface base material.

[0056] As an example of comparison 1 surface base material, the pressure sensitive adhesive sheet was created like the example 1 except having used the commercial polyethylene terephthalate film (Toyobo Co., Ltd. make).

[0057] Carboxylic-acid denaturation rosin-ester:10 section methoxy diethylene-glycol methacrylate:60 section butyl-acrylate:60 section 2-ethylhexyl-acrylate:200 section acrylic-acid:20 section methacrylic-acid dimethylaminoethyl shown in [-izing 3] as example [of a comparison] 2 (manufacture of a binder) emulsification monomer mixed liquor: The 30 section anion system emulsifier (trade name: EMARU NC-35, Kao Corp. make):6 section ion-exchange-water:150 section was mixed and prepared. Subsequently, the binder was manufactured like the example 1.

(Creation of a pressure sensitive adhesive sheet) The pressure sensitive adhesive sheet was

obtained like the example 1 except having used said binder.

[0058] Carboxylic-acid denaturation rosin-ester:180 section methoxy diethylene-glycol methacrylate:10 section butyl-acrylate:50 section 2-ethylhexyl-acrylate:60 section acrylic-acid:10 section methacrylic-acid dimethylaminoethyl shown in [-izing 3] as example [of a comparison] 3 (manufacture of a binder) emulsification monomer mixed liquor: The 90 section anion system emulsifier (trade name: EMARU NC-35, Kao Corp. make):6 section ion-exchange-water:150 section was mixed and prepared. Subsequently, the binder was manufactured like the example 1.

(Creation of a pressure sensitive adhesive sheet) The pressure sensitive adhesive sheet was obtained like the example 1 except having used said binder.

[0059] The example 4 (manufacture of a binder) of a comparison

Carboxylic-acid denaturation rosin-ester:10 section methoxy diethylene-glycol methacrylate:180 section butyl-acrylate:30 section 2-ethylhexyl-acrylate:30 section acrylic-acid:140 section methacrylic-acid dimethylaminoethyl shown in [-izing 3] as emulsification monomer mixed liquor: The 10 section anion system emulsifier (trade name: EMARU NC-35, Kao Corp. make):6 section ion-exchange-water:150 section was mixed and prepared.

Subsequently, the binder was manufactured like the example 1.

(Creation of a pressure sensitive adhesive sheet) The pressure sensitive adhesive sheet was obtained like the example 1 except having used said binder.

[0060] As example of comparison 5 binder, it is an acrylic binder (trade name: NIKAZORU L-145, Nippon Carbide Industries Co., Inc. make) insoluble in water and an alkali water solution at dry weight 22 g/m² It applied and the pressure sensitive adhesive sheet was created like the example 1 except having dried so that it might become.

[0061] The pressure sensitive adhesive sheet was created like the example 1 except having used the commercial water soluble film (trade name: flexible SHINU, Dai-Ichi Kogyo Seiyaku Co., Ltd. make) as an example of comparison 6 surface base material.

[0062] About the pressure sensitive adhesive sheet obtained as mentioned above, the following assessment trial was performed and the obtained result was collectively shown in a table 1.

[0063] (Assessment trial item)

[Adhesive strength] Based on the measuring method of the ordinary state adhesion of JISZ-0237, the adhesive strength to a SUS plate and a glass plate was measured. (Unit: g/25mm)

[0064] [Recycle fitness assessment] With the gestalt of the pressure sensitive adhesive sheet also containing an exfoliation sheet, the pressure sensitive adhesive sheet itself was made into the sample for assessment supposing mixing to a used paper recycle process. 1500ml of water is added to 45g of samples which cut the sheet into the magnitude of about 20mm angle. After adding NaOH 1g furthermore and processing 150000 revolutions with a TAPPI disaggregation machine, Dehydrate on the nylon screen of 60 meshes and 5000ml water was made to distribute the residue again, and the NaOH water solution of 18% concentration was agitated for 120 minutes, keeping 1.5g and 1.8g of deinking agent (trade name: DI-600, Kao Corp. make) 10% concentration solutions at 55 degrees C after addition, respectively.

[0065] Next, the bubble which performs floatation processing for 10 minutes with a floatator, and generates these dispersion liquid in that case was removed with the scraper, the nylon screen of 60 meshes washed with 1000ml of water after dehydration once again, 4500ml of water was made to distribute a residue object, the hand papermaking sheet was created, the residual condition of a non-disaggregation object was viewed, and it judged in the following valuation basis.

(Recycle fitness valuation basis)

O : there is almost no non-disaggregation object.

O : although there is a non-disaggregation object slightly, it is the level which is satisfactory

practically.

x: A non-disaggregation object is considerably conspicuous.

[0066] [-- adhesion processing proper], after carrying out coating of the binder to the remover layer side of an exfoliation sheet and making it dry with a dryer Make one side of a binder side, and one side of a surface base material stick mutually, and it fixes firmly. Pulling a surface base material, lamination and a pressure sensitive adhesive sheet were created and the binder layer and the rear face of a surface base material were judged in the following valuation basis about generating of Siwa to the surface base material by the elasticity or elongation of generating of Siwa to the surface base material by the heat shrink, or a surface base material.

(Adhesion processing proper valuation basis)

O : Siwa to a surface base material does not occur after pressure sensitive adhesive sheet creation.

some of after **:pressure sensitive adhesive sheet creation and surface base materials -- Siwa occurs.

x: Siwa after pressure sensitive adhesive sheet creation and to a surface base material occurs, and it is **.

[0067]

[A table 1]

	接着力		リサイクル適性	粘着加工適性
	SUS板	ガラス板		
実施例 1	1 0 0 0	8 0 0	○	○
実施例 2	1 0 0 0	8 0 0	○	○
実施例 3	9 0 0	7 5 0	○	○
実施例 4	1 0 0 0	8 0 0	○	○
実施例 5	1 0 0 0	8 0 0	◎	○
実施例 6	1 0 0 0	8 0 0	◎	○
実施例 7	8 0 0	6 5 0	○	○
実施例 8	9 0 0	7 0 0	○	○
実施例 9	7 5 0	6 0 0	○	○
実施例10	1 0 0 0	8 0 0	○	△
比較例 1	9 0 0	7 0 0	×	○
比較例 2	1 0 0 0	7 5 0	×	○
比較例 3	3 0 0	2 0 0	◎	○
比較例 4	2 5 0	2 0 0	◎	○
比較例 5	1 4 0 0	7 0 0	×	○
比較例 6	1 0 0 0	8 0 0	◎	×

[0068]

[Effect of the Invention] Without producing Siwa on the occasion of manufacture, although the pressure sensitive adhesive sheet of this invention was using the film for the surface base material as shown in a table 1, after an activity while it had been intact, even if adhesive strength required at the time of attachment was shown, and it mixed in the used paper playback recycle process, it was the pressure sensitive adhesive sheet which decomposes or

distributes easily and is removed out of a process.

[Translation done.]

*** NOTICES ***

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The pressure sensitive adhesive sheet characterized by to be the binder with which it has disaggregation nature to an alkali water solution, and a surface base material is the copolymer which neutralized the carboxylic-acid denaturation rosin content acrylic-ester copolymer with which it is the film which consists of a lactic-acid system polymer, and the binder which constitutes a binder layer consists of the following presentation with the alkaline substance, and has re-disaggregation nature to water or an alkali water solution in the pressure sensitive adhesive sheet which comes to carry out the laminating of an exfoliation sheet, a binder layer, and the surface base material.

(a) A carboxylic-acid denaturation rosin ester monomer .. 5 - 40 % of the weight (b) (Pori) ethylene glycol (meta) acrylate monomer .. C4 of a 5 - 40-% of the weight (c) (meta) acrylic acid - C18 alkyl ester monomer .. 30 - 60 % of the weight (d) ethylene nature unsaturated-carboxylic-acid content monomer .. Monomer in which the 5 - 20-% of the weight (e) above a, b, c, and d and copolymerization are possible .. It is [Claim 2] five to 20% of the weight. The pressure sensitive adhesive sheet according to claim 1 characterized by an exfoliation sheet consisting of a base material which has re-disaggregation nature to water or an alkali water solution.

[Translation done.]